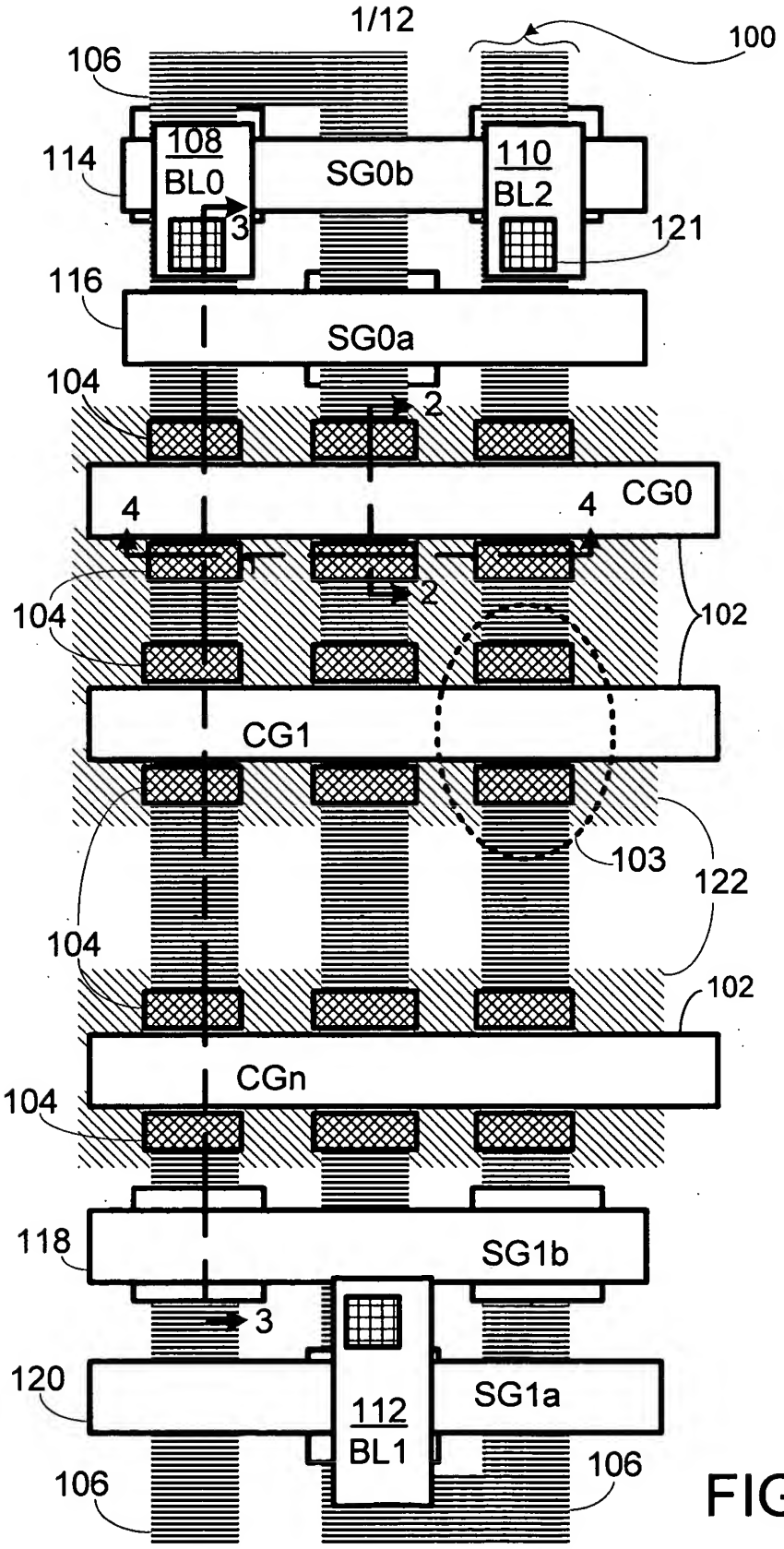
100
106
108
BL0
114
SG0b
110
BL2
3
121
116
SG0a
104
2
4
4
CG0
2
104
102
CG1
103
122
104
102
CGn
104
118
SG1b
3
120
112
BL1
SG1a
106
106

FIG. 1

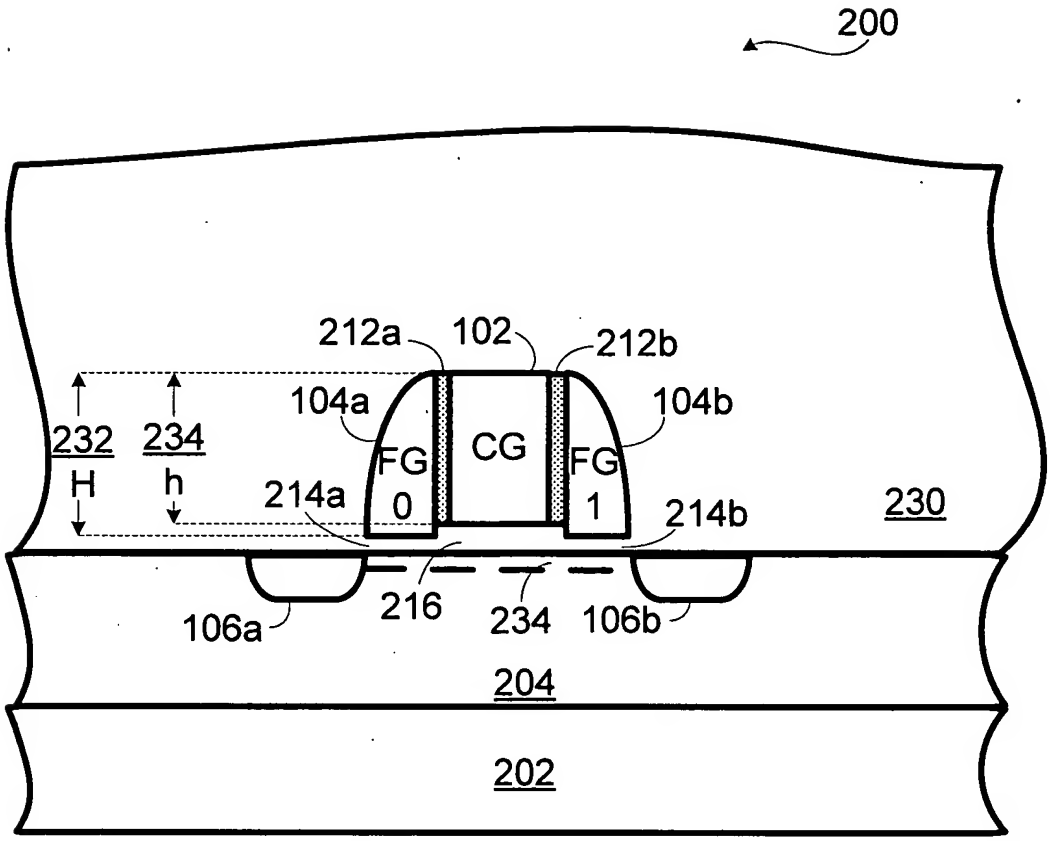
200
212a
102
212b
104a
104b
232
H
234
h
FG
0
CG
FG
1
214a
214b
230
106a
216
234
106b
204
202

FIG. 2A

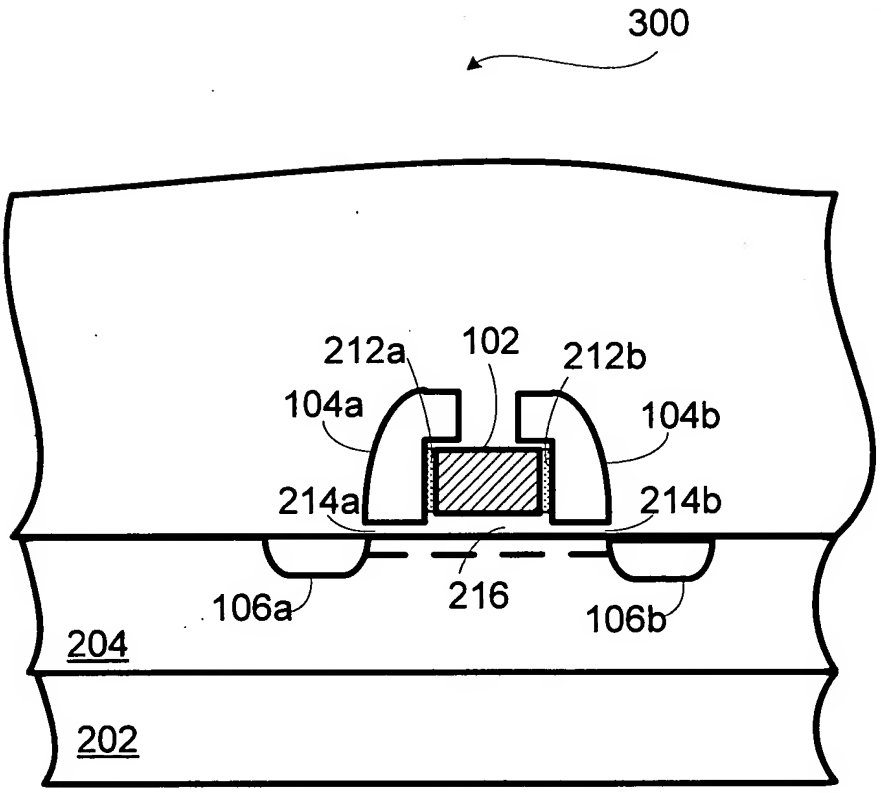

FIG. 2B

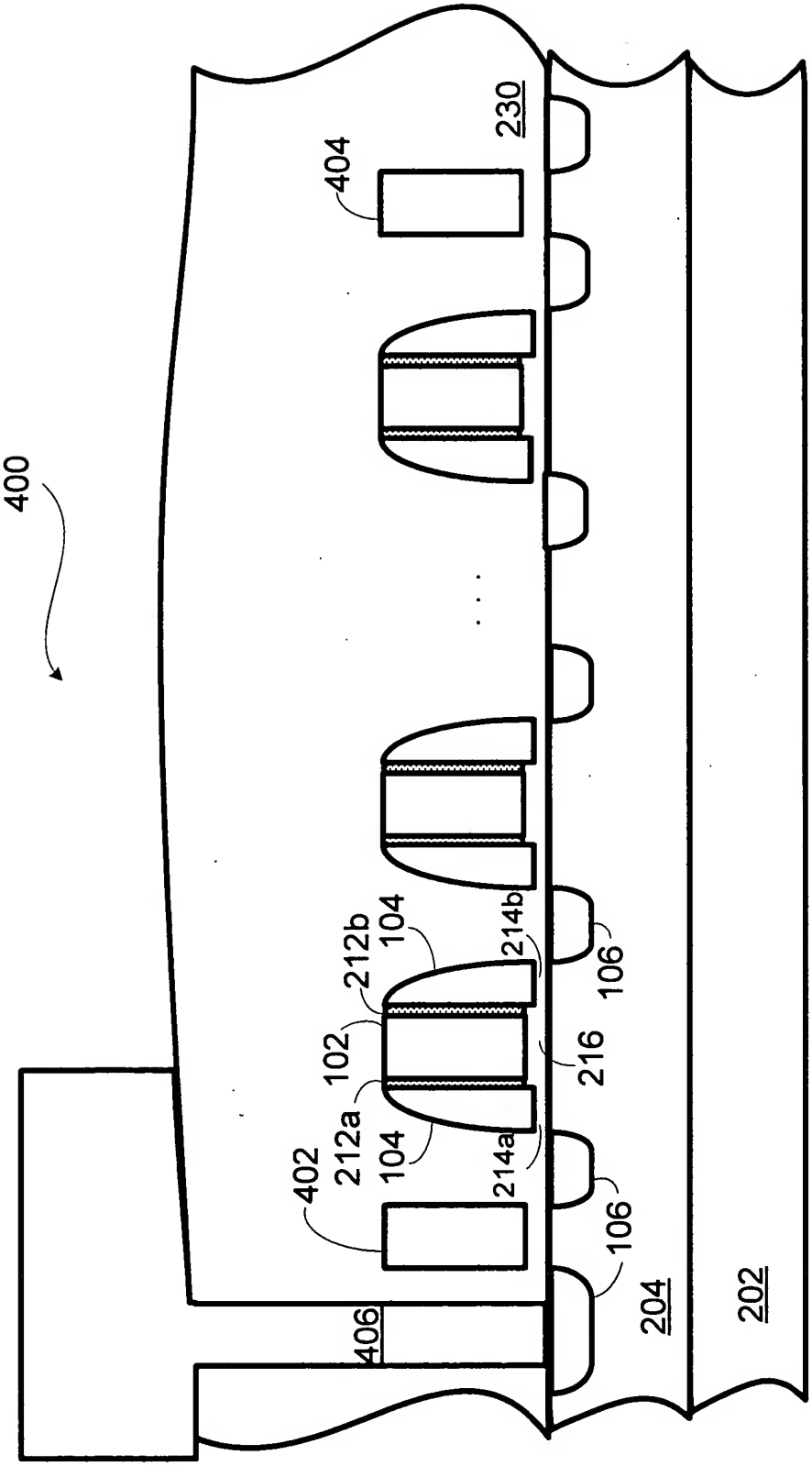
400
404
230
212b
104
214b
106
102
216
212a
104
214a
402
106
406
204
202

FIG. 3

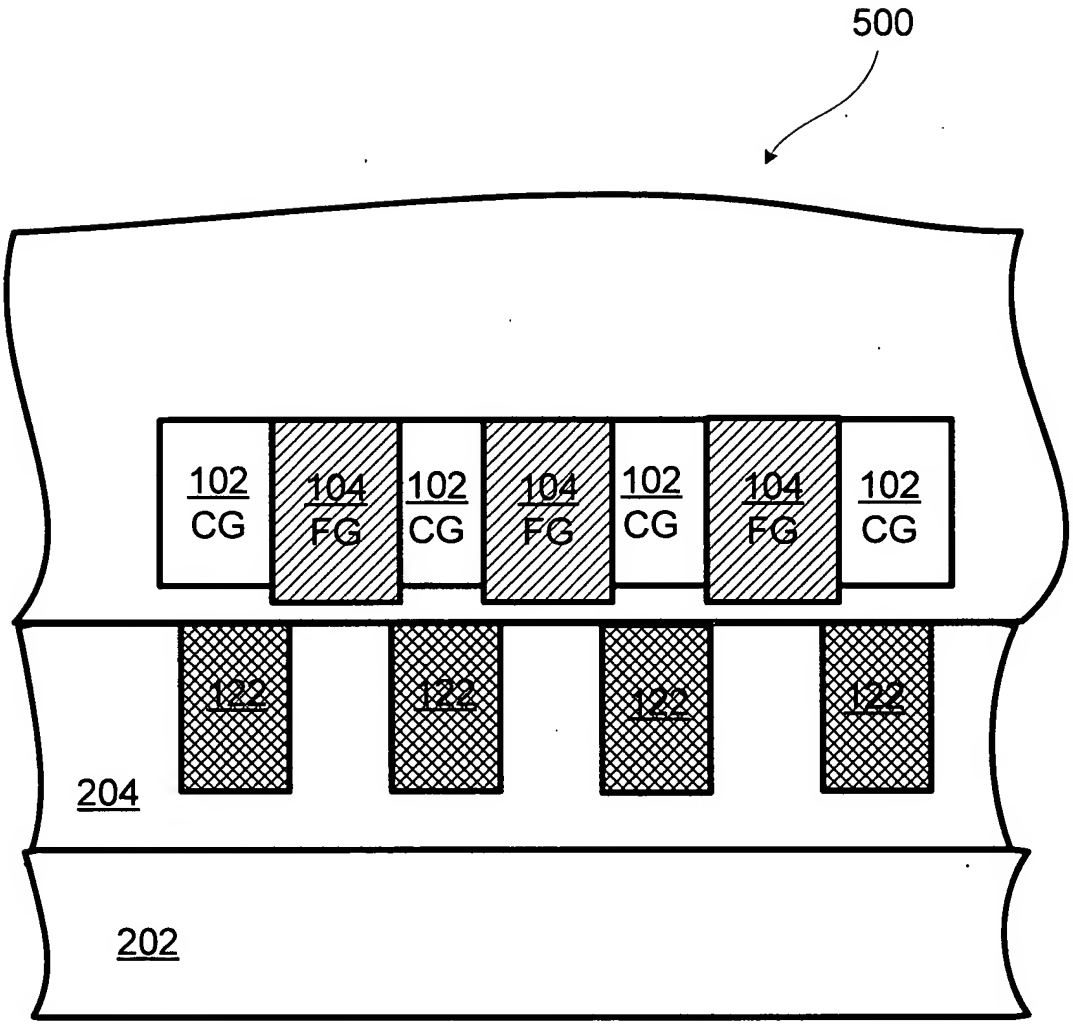
500
102
CG
104
FG
102
CG
104
FG
102
CG
104
FG
102
CG
122
122
122
122
204
202

FIG. 4

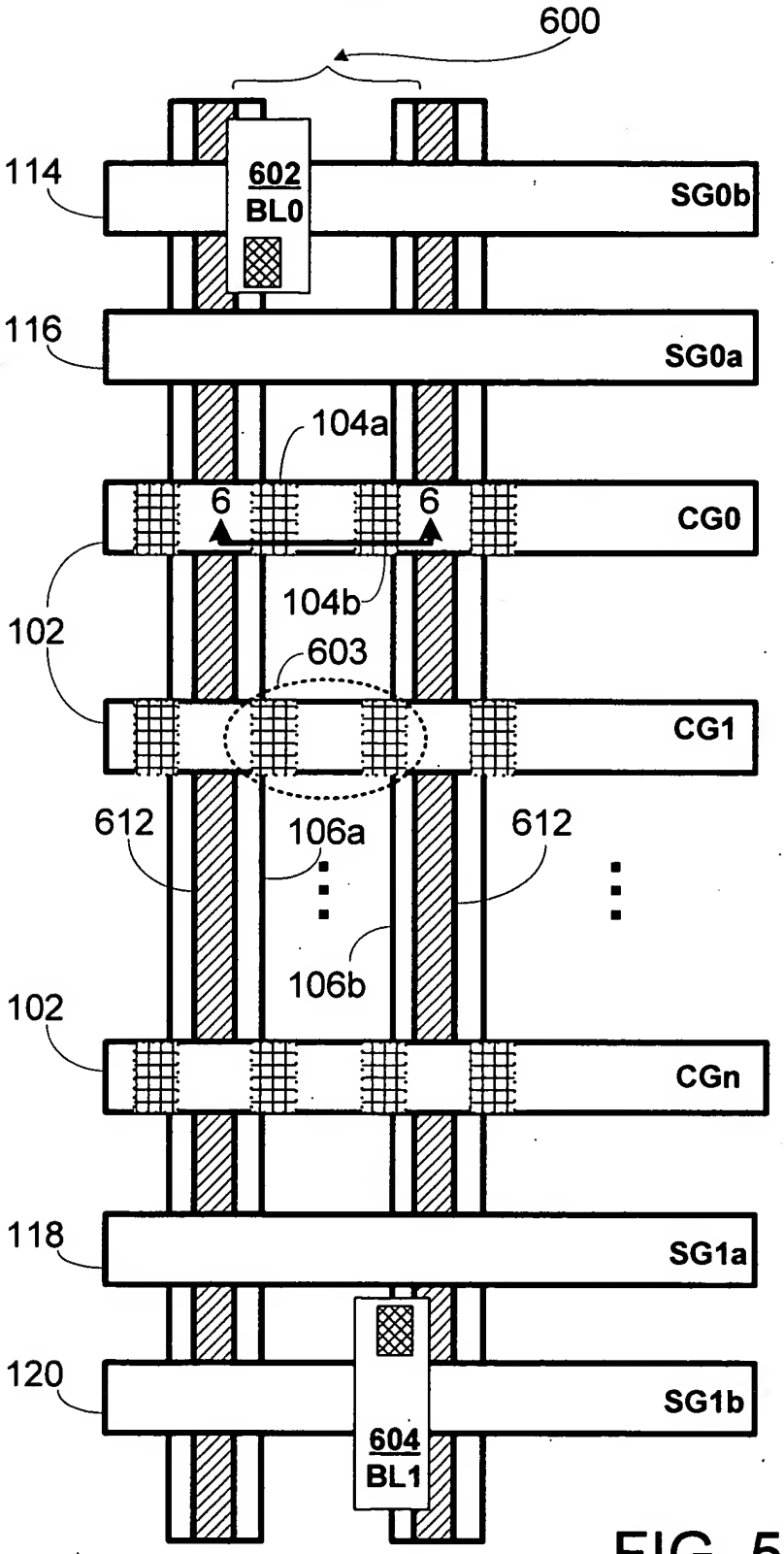
600
114
602
BL0
SG0b
116
SG0a
104a
6
6
CG0
104b
102
603
CG1
612
106a
612
106b
102
CGn
118
SG1a
120
SG1b
604
BL1

FIG. 5

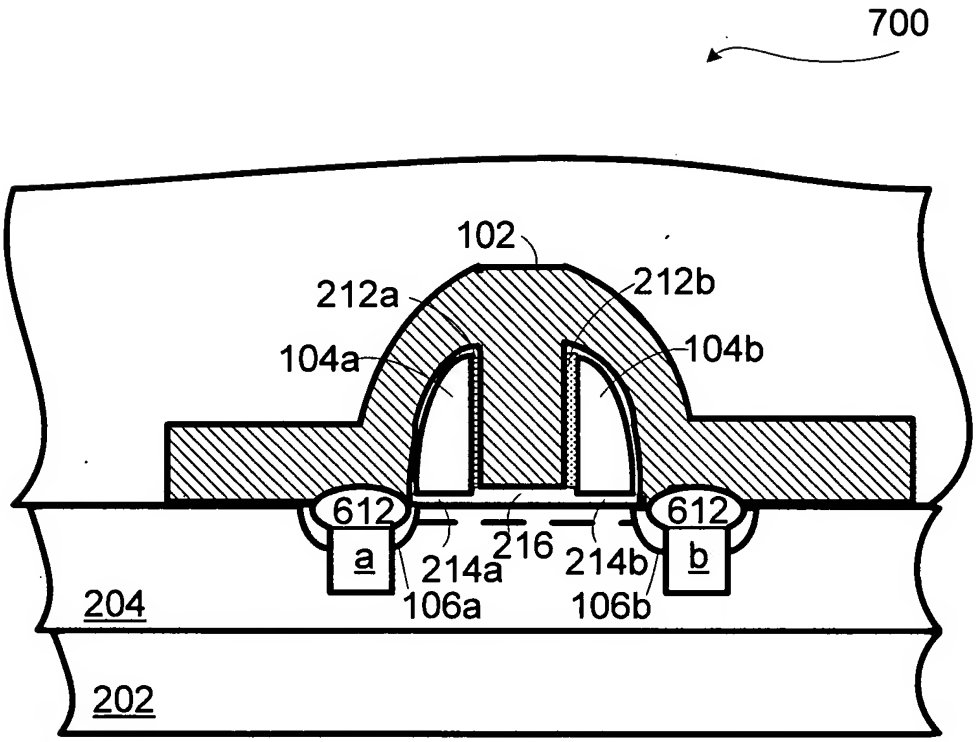
700
102
212a
212b
104a
104b
612
612
a
b
216
214a
214b
106a
106b
204
202

FIG. 6A

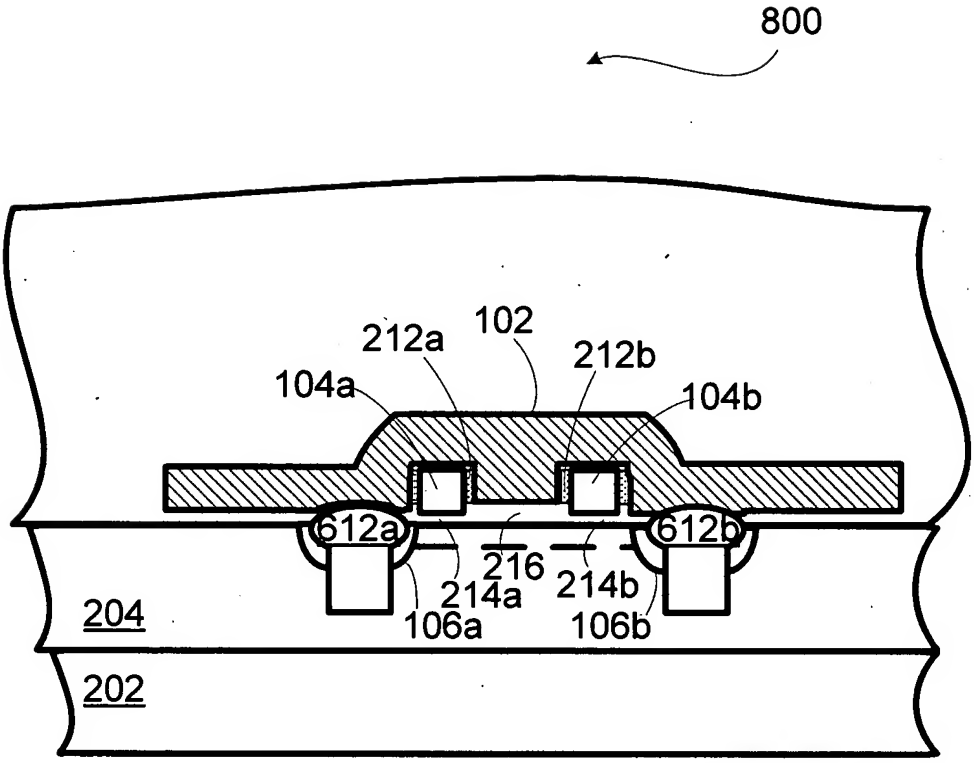
800
212a
102
212b
104a
104b
612a
612b
216
214a
214b
106a
106b
204
202

FIG. 6B

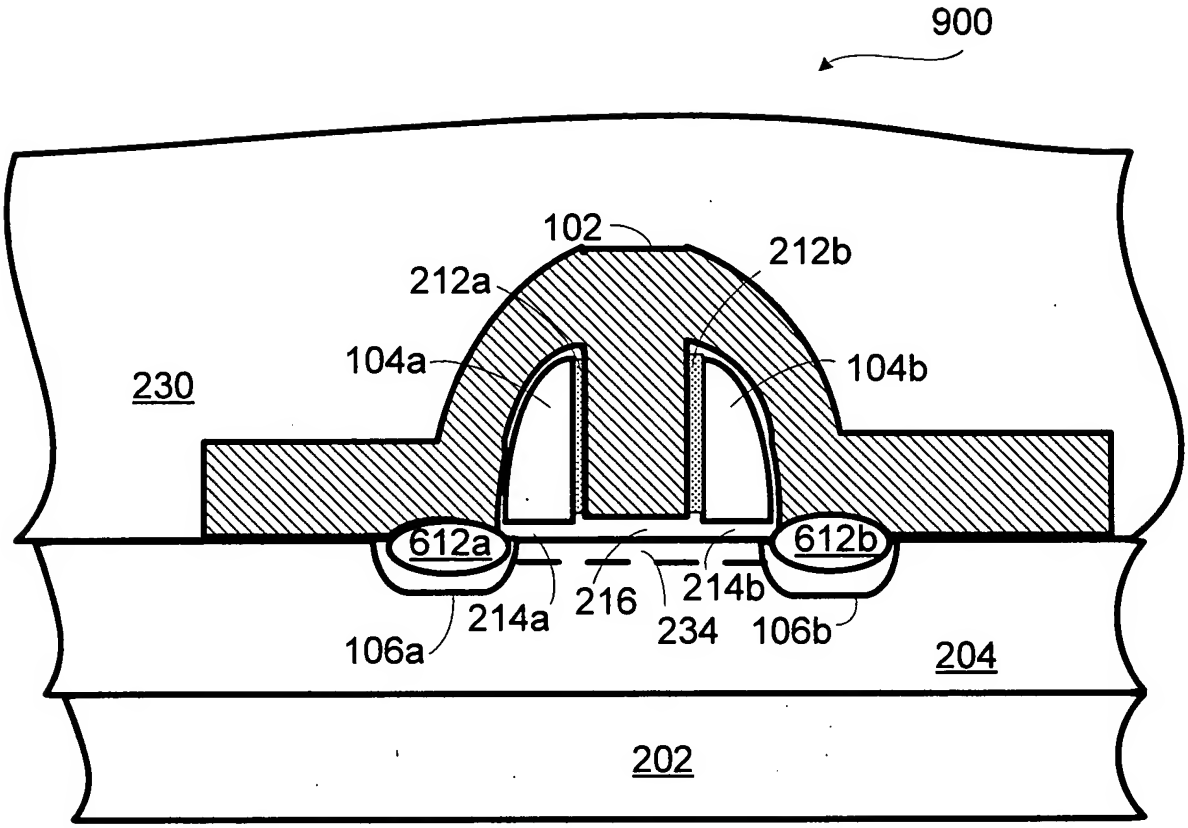
900
102
212a
212b
104a
104b
230
612a
612b
214a
216
214b
234
106a
106b
204
202

FIG. 6C

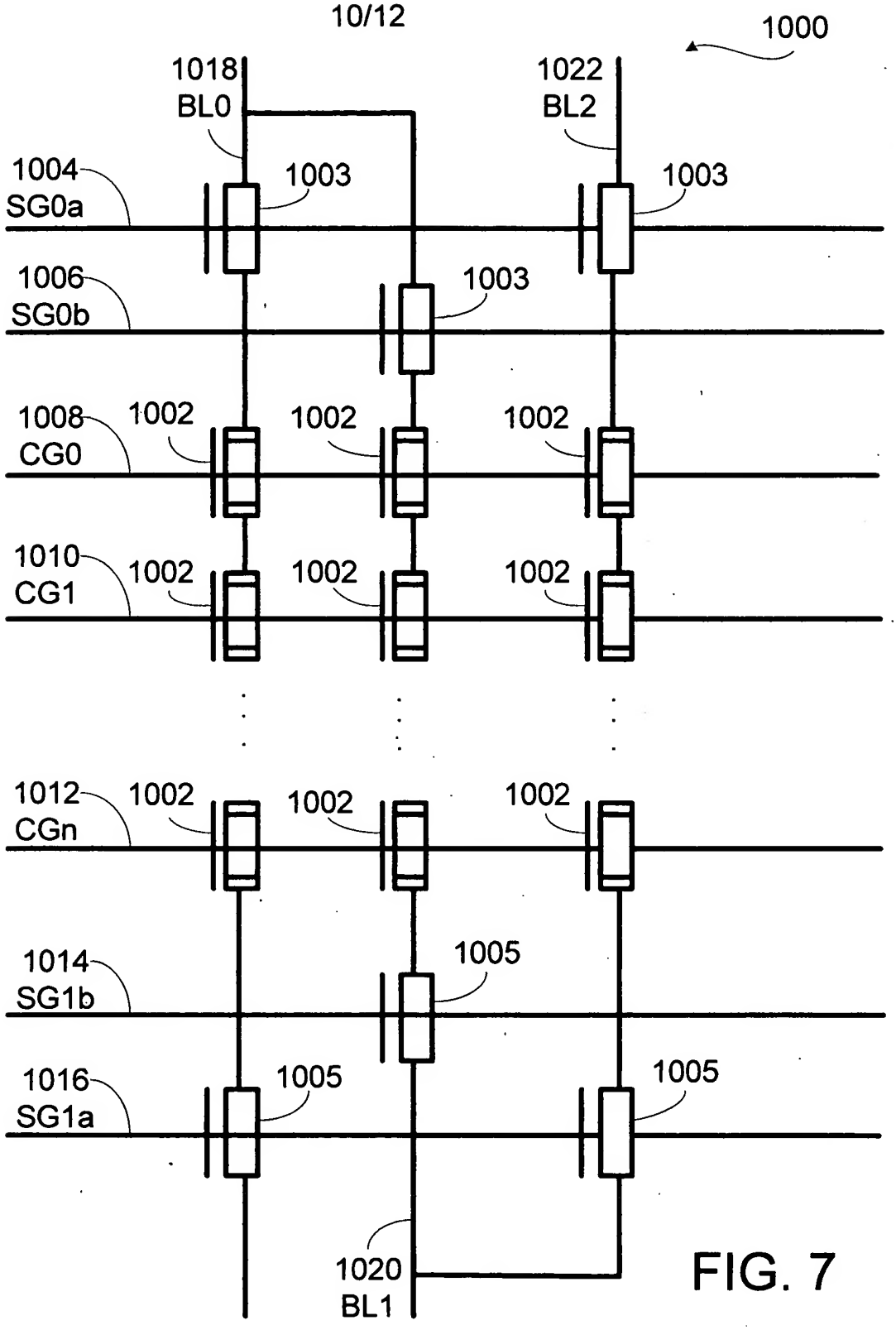
1000
1018
BL0
1022
BL2
1004
SG0a
1003
1003
1006
SG0b
1003
1008
CG0
1002
1002
1002
1010
CG1
1002
1002
1002
1012
CGn
1002
1002
1002
1014
SG1b
1005
1016
SG1a
1005
1005
1020
BL1

FIG. 7

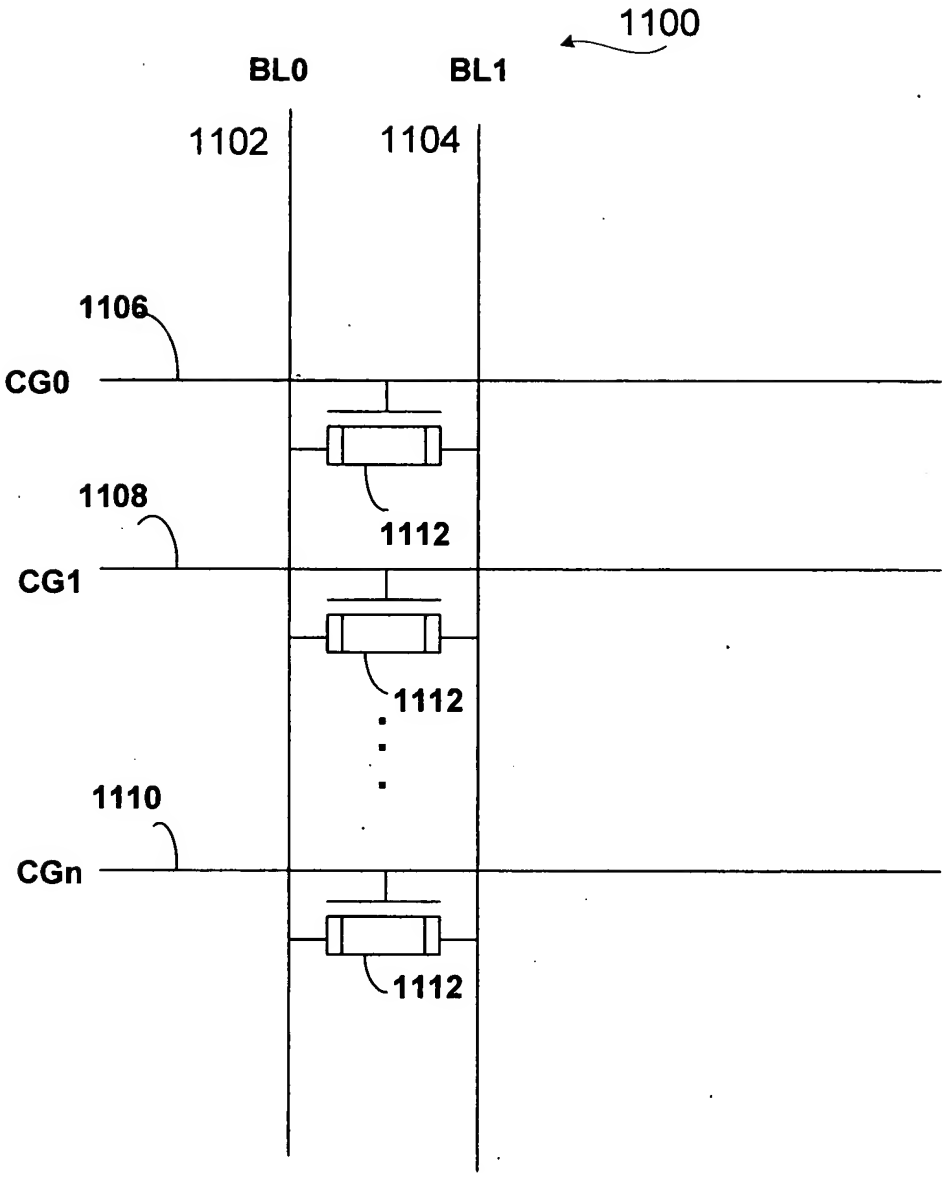
1100
BL0
BL1
1102
1104
1106
CG0
1112
1108
CG1
1112
1112
1110
CGn
1112

FIG. 8

P-Type Diffusion

Erase		
	select	unselect
106a node	x or Vpp	Vpp
106b node	Vpp	Vpp
CG	Vnn	Vpp
SG0	Vpp or 0v	Vpp
SG1	0v	Vpp
well	Vpp	Vpp or Vcc

Soft avalanche hot electron (SAHE) program		
	select	unselect
106a node	x	vcc or x
106b node	Vnn	Vcc or x
CG	Vpp	Vnn
SG0	Vcc	Vcc
SG1	Vnn	Vcc
well	0v to Vcc	0v to Vcc

Channel hot electron (CHE) program		
	select(right bit)	unselect
106a node	Vpp	Vpp
106b node	0v	Vpp
CG	Vppr	0v to -2v*
SG0	0v	Vpp
SG1	0v	Vpp
well	Vpp	Vpp

Read		
	select(right bit)	unselect
106a node	0v to Vcc	Vcc
106b node	Vcc	Vcc
CG	0v to Vcc	0v to Vcc
SG0	0v to -2v	Vcc
SG1	0v to -2v	Vcc
well	Vcc	Vcc

Note:

1. Vnn = -4.5v to -10v
2. Vpp = 4v to 11v

N-Type Diffusion

Erase(electrons ejected from floating gate)		
	select	unselect
106a node	x or Vpp	0v
106b node	Vpp or 0v	0v
CG	Vnn	Vpp or vcc
SG0	Vpp or 0v	0v
SG1	Vpp or 0v	0v
well	Vpp	Vpp or Vcc

Channel program		
	select	unselect
106a node	x	x
106b node	Vnn	0v or Vnn
CG	Vpp	Vnn
well	Vnn	Vnn

Channel hot electron (CHE) program (electrons injected to floating gate)		
	select(right bit)	unselect
106a node	0v	0v
106b node	Vpp	0v
CG	Vppr	0v to vpp
SG0	vpp	0v
SG1	vpp	0v
well	0v	0v

Read		
	select(right bit)	unselect
106a node	0v to Vcc	0v
106b node	0v	0v
CG	0v to Vcc+2v	0v to Vcc+2v
SG0	vcc	0v
SG1	vcc	0v
well	0v	0v

3. Vppr = 0v to Vpp, ramp up or ramp down

* Vpp to Vpp+2v for memory string of FIG. 5

FIG. 9